**The Crime Scene:**

Cindy Kaiser, age 24, was found stabbed to death in the bedroom of her second floor apartment. Police detectives discovered skin under one of her fingernails and reasoned that she might have scratched her attacker before she was killed. No motive for the killing has been determined.

Two suspects were discovered to have fresh scratches:

Suspect X: Martin Jones – Was the victim’s boyfriend. Martin had a scratch on his forearm, which he said happened while he was hunting grouse. Martin’s alibi cannot be supported.

Suspect Y: Harold Kaiser – Was the victim’s ex-husband. Harold had a scratch on his face. According to Harold, he cut himself while shaving. Harold said that he was asleep at home by himself at the time of the murder.

**Forensic Procedures**:

The DNA from the skin found under Ms Kaiser’s fingernails was cut with two different restriction enzymes and amplified using the polymerase chain reaction (PCR) technique. Identical treatment was carried out on DNA from cells taken from the two suspects. In a normal crime lab, these procedures would be collected and processed using sterile technique. After PCR was completed, the police lab placed DNA samples into the following containers:

DNA Samples:

1. Suspect X DNA fragments cut with enzyme #1 digest
2. Suspect X DNA fragment cut with enzyme #2 digest
3. Crime Scene DNA (taken from skin underneath victim’s fingernails) fragments cut with enzyme #1 digest.
4. Crime Scene DNA (taken from skin underneath victim’s fingernails) fragments cut with enzyme #2 digest.
5. Suspect Y DNA fragments cut with enzyme #1 digest.
6. Suspect Y DNA fragments cut with enzyme #2 digest.

Your lab group will use police lab electrophoresis techniques to separate DNA fragments in an agar gel. You will then compare DNA fingerprints to see if Crime Scene DNA evidence supports the guilt or innocence of one, both, or neither suspect.

**Crime Scene Lab Analysis:**

**Data**:

Make a sketch of your gel showing the bands of DNA fragments that appeared during the procedure you just completed. Make sure to label each lane with the appropriate DNA sample loaded into the well.

1. Why do a series of bands appear in the gel? What is true of the DNA fragment band(s) closest to the positive end of the gel (the end opposite the wells)?
2. What caused the DNA to migrate through the gel?
3. Would you expect your personal DNA fingerprint to be identical to any of the persons tested in this lab? Explain.
4. Based on the results of your gel, what evidence do you have to present to the court concerning this murder case?
5. Could these DNA samples have been distinguished from on another if only enzyme #1 had been used? Why or why not?